certain resistance represents the *Ohm*. The *Ohm* is a small coil of German silver wire representing the resistance overcome by a current in a certain time." What kind of conception can Mr. Beechy have of current and of resistance?

Still, as we have already said, we are much pleased with Mr. Beechy's little book. The author can readily make the necessary improvements in a future edition.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

Action of Light on Ebonite

IT is well known to electricians that the insulating power of ebonite gradually diminishes in consequence of the formation of a conducting layer of sulphuric acid on the surface (produced by the oxidation of the sulphur used in vulcanising). It is perhaps not so well known that exposure to light facilitates this change, if indeed it is not an essential condition.

In order to put this to the test, a plate of ebonite polished on both sides was cut into four pieces, each about 52 mm. long, 22 mm. wide, and 8·5 mm. thick, exposing therefore a surface of about 3,500 square millimetres (the edges were not polished), and one half of each piece was varnished with an alcoholic solution of shellac. Two pieces were placed in wide test tubes plugged with cotton wool, and the other two were sealed hermetically in similar tubes. One of the sealed tubes and one plugged with cotton wool were placed in a dark drawer, and the other pair exposed to light in the laboratory, and during the latter part of the experiment to direct sunlight. The experiment was commenced on December 26, 1874, and after some time minute drops of liquid were perceived on the ebonite exposed to light and air, the remaining three pieces retaining their original appearance. Between September 1 and 21 of this year the sealed tube exposed to light was accidentally broken, so that for a period of less than three weeks the ebonite in it was exposed to both light and air. On September 21 the tubes were opened, the ebonite washed with water, and the amount of acid determined by standard solution of caustic soda. No trace of acid could be detected on either of the pieces of ebonite which had been kept in the dark; on the one which had been exposed to light in the closed tube, ·343 milligrammes of sulphuric acid were found, and on that exposed to light and air, 2·646 milligrammes.

By a mistake it was not ascertained whether the part of the ebonite which had been varnished had become acid, but during the time of exposure small drops were also perceptible on this portion of the surface. When the pieces were exposed to direct sunlight another change became visible, the drops being replaced by what appeared to be small particles of a yellowish white solid. This may have been due to the heating of the black material by the sun and consequent action of the strong acid on the solid.

I was led to try this experiment by noticing that an ebonite plate electric machine which had been kept in a light room had changed in colour except on those portions which had been protected from light by the rubbers. The exposed surface acquired a brown colour and the machine acted very badly. On cleaning the plate with a hot solution of caustic soda, large quantities of ammonia were evolved and the brown surface became softened, so that it could be easily scraped off.

I had an opportunity of noticing a remarkable instance of this action a short time since in the laboratory of my friend, Mr. Warren De la Rue. An apparatus with an ebonite base, with three adjusting screws, was standing at some distance from a window. The surface of the plate was covered with a fine dew of an acid liquid, except at the parts where the shadows of the heads of the screws fell. The surface at these places completely retained its original polish.

The interest of this matter must be my excuse for communicating the results of an incomplete experiment.

Royal Indian Engineering College, Cooper's Hill, October 2 HERBERT MCLEOD

Visual Phenomena

THE following quotation was written, and a stereo-slide to which it was appended was sketched by myself in January last, and shown at the *soirée* of the Manchester Mechanical and Scientific Society then held:—

"In looking through comparative darkness at any bright light, the writer, who is near-sighted, sees in place of such light or any number of such lights, a bright disc or discs each like the stereoscopic combination of the figures here shown.

"Are such figures seen by other myopic subjects, and do they consist of the middle portions of the crystalline lenses as seen *from within?*

"In order to develop the figures the source of light must be sufficiently distant to subtend an angle of about one-twelfth of a degree; the discs have an apparent diameter of about 1° or more, being like the pupils which seem to define their outline, persistently variable in size (*i.e.*, always *on the move*). The disc-patterns are constant in markings and position, and their brighter lines irradiate the darkness (of the vitreous humour) as though by refraction from the (?) denser portions of the lens."

The discs above mentioned differ a little in each eye, but the groundwork in both cases is a somewhat irregularly five-armed star; each arm has a shaded axis with bright margins, and they radiate from a luminous ring inclosing a darker central spot. The whole figure is well illuminated, its details being defined rather by variations of light than by dark markings, and their comparative brightness *inter se* being not unlike that shown by the various parts of the lunar surface at the full. The intervals or *sectors* of the figures are filled with a mottled pattern not easy to sketch; one space contains a figure like a Y with the stem outwards; another a V point inwards. Some dark spots, inside bright rings, as they are exposed or excluded by the margin of the figure, curiously define the varying size of the pupil as one approaches or recedes from the light; at about 12 yards from (say) a street lamp the disc is suddenly supplanted by the true form of the gas flame.

I see these appearances with the unassisted eyes; a concave lens at once snuffs them out. About sixteen years ago I tried some experiments with *convex* lenses, and found that on holding the lens farther from the eye than its (the lens's) focal distance, the star figure suddenly became a NEGATIVE—its cardinal points reversed, its lights shadows, and *vice versâ;* the arms bright, with shaded borders, and the dark spots bright, with shaded rings.

On coming from darkness into a gas-lighted street, the star discs appear large for about a second, then suddenly contract, but retain a slight oscillation, corresponding with the slight but incessant movements of the iris. The conjunction of lightning and street-lamps has a curious effect; *after* each flash the hundred or more of discs, one at each light, suddenly contract and more leisurely expand, the contraction taking about one second and the readjustment about four.

In place of Mr. Mallock's Fig. 2 (p. 350), I get a sort of very acute St. Andrew's cross, its arms consisting of *parallel* rays crossed by numberless very fine striations.

Fig. 3 I only see as a tangled confusion, owing to the hairs not being so neatly arranged as in Fig. 4; yet their foreshortened crookedness seems, by way of amends, to be responsible for the following:—

In looking towards, but a little below, the sun, which should be at about its winter meridian altitude, the upper field of view is crossed by a sort of variegated aurora of rainbow colours, which have almost a polariscope brightness, and are lined and ringed, as it were, upon a sort of chain pattern foundation.

It was in November or December last that I first found that the before-named star figures were not necessarily extinguished by a light sufficiently strong to allow of my sketching them; the occasion being a highly successful Manchester copy of a London fog. A lucid interval and a lowered gas-jet in a large room accidentally gave the requisite conditions.

If considered of sufficient interest, I would send copies of the discs which are sketched nearly two inches in diameter. The disc of a gas-lamp at 100 yards distance has an apparent diameter of nearly 3 feet, and a lighted up cotton-mill is all light, no wall.

Sale, Manchester H. B. BIDEN

IF Mr. T. W. Backhouse (NATURE, vol. xiv., p. 474) is right in interpreting the phenomenon of radiance described by Mr. A.

Mallock, as due (in Mr. Mallock's case) to *under*-refraction of rays (as in my case it certainly is due to *over*-refraction), his own experience furnishes a good connecting-link between the "two different, though allied, phenomena." It would be well, however, in order to avoid all uncertainty, that we should know the result, in Mr. Mallock's case, of experiments with an obstacle advanced in front of the eye from a given direction. The experiment with concave or convex spectacles is not quite satisfactory, because it involves a breach of continuity in the observation of the phenomenon.

In concluding that I am "evidently short-sighted," Mr. Backhouse attributes to the whole lens a fault which really belongs only to certain radial portions of the marginal region of the lens. In daylight I see distant objects sharply defined, and that without excessive contraction of the pupil. It is at night, when the pupil is largely dilated and the *marginal* part of the lens becomes exposed to incident rays, that I see radiance around a distant lamp.

These phenomena being necessarily personal to each observer, not admitting of observation by one person for another, and evidently presenting wide differences, it would be interesting to collect and tabulate the facts as described by a number of competent observers. I would suggest that the initiator of this correspondence (Mr. A. Mallock), or some other person, with the approval of the editor of NATURE, should receive and tabulate such facts as may be communicated on this subject, with a view to the publication of the results in a future number of NATURE.

HUBERT AIRY

Blackheath, October 3

An Intra-Mercurial Planet

IF the phenomenon seen by the Hon. F. A. R. Russell was really a transit of this planet, Hofrath Schwabe must have very narrowly escaped witnessing it, for on turning to his MSS. I found the following observation for the date in question :—

"1860, Jan. 29, 9m. (8.11 A.M., G.M.T.).

"Nur die Hauptflecken von 10 deutlich dem Austritte nahe, 11 undeutlich, 12 u. 13 nicht wesentlich verändert."

The numbers refer to the drawing of sun-spots made on the preceding day, indicating also the order in which the spots have appeared since the commencement of the year. No. 10 is a group of spots near the limb, No. 11 a group of very small spots also close to the limb, whilst 12 and 13 are clusters of large spots both of sufficient magnitude to be visible to the naked eye through a fog.

Unfortunately the Photoheliograph was not at work on that day, nor did Carrington make any observations, the sky being cloudy.

G. M. WHIPPLE

Kew Observatory, October 7

Inequality of the Semi-Diurnal Oscillations of Barometric Pressure

WILL you oblige me by publishing the following corrections of certain of the formulæ in my paper on the Inequality of the Semi-Diurnal Oscillations of Barometric Pressure, in NATURE, vol. xiv. p. 316? I regret that the distance of my place of residence has prevented my sending you an earlier notice of the errors.

Formula (2) should stand thus—

$$\tau = V\rho \frac{P}{\mathsf{P}} \frac{T_o}{T} \&c.,$$

"wherein ρ is the density of air at standard pressure P and temperature T_o, &c."

The same symbol P should be substituted for P in the next formula, and the explanation should run—

"where s is the hypothetical density of water vapour at P and T_o, and λ its latent heat at temperature T. Substituting for s its approximate equivalent $\frac{5}{8}\rho$,

$$\tau = V \tfrac{5}{8}\rho \frac{\mathsf{P}'}{\mathsf{P}} \frac{T_o}{T}\lambda."$$

HENRY F. BLANFORD

Meteorological Office, Calcutta, September 5

Miniature Physical Geology

THE occurrence of miniature earth-pillars (vol. xiv. p. 423) is by no means unusual even in our own country.

I noticed some excellent examples some years ago in the neighbourhood of Halifax. From a steep exposure of alternating strata of sandstone and shales, the sandstone stood out in broad ledges which received on their upper surface the *débris* from the weathering shale, consisting of mud and plate-like fragments of the shale itself. Under the action of the rain this *débris* had been carved out into perfect pillars, each capped with its plate of shale, and with a numerous progeny of smaller pillars clustering round it, each also with its protecting roof of jutting shale.

Near the Mumbles (Swansea) I visited a limestone quarry at the foot of which lay a talus of soft earth embedding a number of fragments of limestone. Here not only were large earth-pillars from two to four inches high, and in every detail of form resembling those of the Tyrol, to be seen sculptured from the talus, but a heavy shower of rain falling at the time was actually at work producing fresh columns and enlarging the old ones. I had with me at the time, by good fortune, a party of some forty students, and was pleased beyond measure to be able to point out to them these beautiful pillars and the process of their growth. So perfect were they that one gentleman more enterprising than the rest wished to transport one fine group to the safe keeping of a glass case.

But the most striking examples of earth-pillars I have seen anywhere occur in this neighbourhood. The trias, which here frequently consists of a breccia of hard sub-angular fragments of various kinds of rocks embedded in a red sandy marl, is in many localities cut through by the roads, and thus exposed in almost vertical faces of considerable length on the side of the roadway. These faces have very generally been carved out into earth-pillars, which, whilst resembling in all else the Botzen pillars, differ from them in remaining attached vertically to the parent rock by one face, and thus are free on three sides only. This ornamentation of the rock-faces in high relief may be seen continuously for many yards, I should think for hundreds, and it is permanent from year to year. No one walking from Dawlish to Little Haldon can fail to be struck with its singular appearance, and it is especially well exhibited on the right hand bank of the road skirting the north-east side of Luscombe grounds. The ordinary earth-pillars, free on all sides, may also be occasionally noticed in great perfection. After last year's heavy rains I saw several measuring 3 inches high and 2 inches broad at the summit: in one case the capping was not of stone, but a piece of growing moss, which had become detached from a mossy bank by a landslip on a small scale.

W. J. SOLLAS

Dawlish, Devons

The Claywater and Meno Meteorites

THE analyses of these remarkable bodies by Dr. J. Lawrence Smith, as given in the *American Journal of Science* for September, 1876, suggest a new and interesting inquiry in astro-meteorology. These analyses gave the following results :—

	Claywater.	Meno.
Stony matter	78·33	77·76
Metallic particles	17·07	18·00
Troilite	4·60	4·24
	100·00	100·00
Stony part, soluble	47·20	48·70
Stony part, insoluble	52·80	51·30
	100·00	100·00
Stony part, analysed as a whole.		
Silica	44·98	44·70
Protoxide of iron and aluminia	21·95	22·26
Magnesia	29·30	28·97
Lime	1·80	1·85
Soda	1·32	1·20
	99·35	98·98
Metallic particles.		
Iron	92·15	91·86
Nickel	7·37	7·53
Cobalt	·28	·13
Copper and phosphorus	Traces of both.	
Specific gravity	3·66	3·65

"In regarding the above comparative statement of the composition of these meteorites," says Dr. Smith, "it will be seen that the compositions of the two as made out by me do not